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Ginter et al.

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(54) **SYSTEMS AND METHODS FOR THE  
SECURE TRANSACTION MANAGEMENT  
AND ELECTRONIC RIGHTS PROTECTION**

3,931,504 1/1976 Jacoby .  
3,946,220 3/1976 Brobeck et al. .

(List continued on next page.)

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#### FOREIGN PATENT DOCUMENTS

62-241061 12/1984 (BE) .  
9 004 79 12/1984 (BE) .  
3803982A1 1/1990 (DE) .

(List continued on next page.)

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#### OTHER PUBLICATIONS

David Arneke and Donna Cunningham, Document from the Internet: AT&T encryption system protects information services, (News Release), Jan. 9, 1995, 1 page.

(List continued on next page.)

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#### Related U.S. Application Data

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(51) Int. Cl.<sup>7</sup> ..... **H04L 9/32**

(52) U.S. Cl. .... **705/57; 705/52**

(58) Field of Search ..... **705/51, 52, 56, 705/57; 380/201-203; 386/94, 124**

#### (56) References Cited

##### U.S. PATENT DOCUMENTS

3,573,747 4/1971 Adams et al. .  
3,609,697 9/1971 Blevins .  
3,796,830 3/1974 Smith .  
3,798,359 3/1974 Feistel .  
3,798,360 3/1974 Feistel .  
3,798,605 3/1974 Feistel .  
3,806,882 4/1974 Clarke .  
3,829,833 8/1974 Freeny .  
3,906,448 9/1975 Henriques .  
3,911,397 10/1975 Freeny .  
3,924,065 12/1975 Freeny .

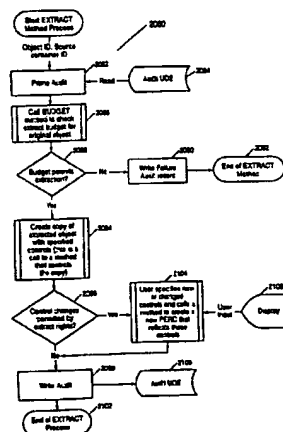
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#### (57) ABSTRACT

The present invention provides systems and methods for secure transaction management and electronic rights protection. Electronic appliances such as computers equipped in accordance with the present invention help to ensure that information is accessed and used only in authorized ways, and maintain the integrity, availability, and/or confidentiality of the information. Such electronic appliances provide a distributed virtual distribution environment (VDE) that may enforce a secure chain of handling and control, for example, to control and/or meter or otherwise monitor use of electronically stored or disseminated information. Such a virtual distribution environment may be used to protect rights of various participants in electronic commerce and other electronic or electronic-facilitated transactions. Distributed and other operating systems, environments and architectures, such as, for example, those using tamper-resistant hardware-based processors, may establish security at each node. These techniques may be used to support an all-electronic information distribution, for example, utilizing the "electronic highway."

72 Claims, 146 Drawing Sheets



## U.S. PATENT DOCUMENTS

3,956,615	5/1976	Anderson et al. .	4,688,169	8/1987	Joshi .
3,958,081	5/1976	Ehrsam et al. .	4,691,350	9/1987	Kleijne et al. .
3,970,992	7/1976	Boothroyd et al. .	4,696,034	9/1987	Wiedemer .
4,048,619	9/1977	Forman, Jr. et al. .	4,700,296 *	10/1987	Palmer, Jr. et al. .... 705/32
4,071,911	1/1978	Mazur .	4,701,846	10/1987	Ikeda et al. .
4,112,421	9/1978	Freeny .	4,712,238	12/1987	Gilhausen et al. .
4,120,030	10/1978	Johnstone .	4,713,753	12/1987	Boebert et al. .
4,163,280	7/1979	Mori et al. .	4,740,890	4/1988	William .
4,168,396	9/1979	Best .	4,747,139	5/1988	Taaffe .
4,196,310	4/1980	Forman et al. .	4,757,533	7/1988	Allen et al. .
4,200,913	4/1980	Kuhar et al. .	4,757,534	7/1988	Matyas et al. .
4,209,787	6/1980	Freeny .	4,768,087	8/1988	Taub et al. .
4,217,588	8/1980	Freeny .	4,791,565	12/1988	Dunham et al. .
4,220,991	9/1980	Hamano et al. .	4,796,181	1/1989	Wiedemer .
4,232,193	11/1980	Gerard .	4,799,156	1/1989	Shavit .
4,232,317	11/1980	Freeny .	4,807,288	2/1989	Ugon et al. .
4,236,217	11/1980	Kennedy .	4,817,140	3/1989	Chandra et al. .
4,253,157	2/1981	Kirschner et al. .	4,823,264	4/1989	Deming .
4,262,329	4/1981	Bright et al. .	4,827,508	5/1989	Shear .
4,265,371	5/1981	Desai et al. .	4,858,121	8/1989	Barber et al. .
4,270,182	5/1981	Asija .	4,864,494	9/1989	Kobus .
4,278,837	7/1981	Best .	4,866,769 *	9/1989	Karp ..... 380/56
4,305,131	12/1981	Best .	4,868,877	9/1989	Fischer .
4,306,289	12/1981	Lumley .	4,903,296	2/1990	Chandra et al. .
4,309,569	1/1982	Merkle .	4,924,378	5/1990	Hershey et al. .
4,319,079	3/1982	Best .	4,930,073	5/1990	Cina .
4,323,921	4/1982	Guillou .	4,949,187	8/1990	Cohen .
4,328,544	5/1982	Baldwin et al. .	4,975,647 *	12/1990	Downer et al. .... 713/168
4,337,483	6/1982	Guillou .	4,977,594	12/1990	Shear .
4,361,877	11/1982	Dyer et al. .	4,999,806	3/1991	Chernow et al. .
4,375,579	3/1983	Davida et al. .	5,001,752	3/1991	Fischer .
4,433,207	2/1984	Best .	5,005,122	4/1991	Griffin et al. .
4,434,464	2/1984	Suzuki et al. .	5,005,200	4/1991	Fischer .
4,442,486	4/1984	Mayer .	5,010,571	4/1991	Katznelson .
4,446,519	5/1984	Thomas .	5,023,907	6/1991	Johnson et al. .
4,454,594	6/1984	Heffron et al. .	5,047,928	9/1991	Wiedemer .
4,458,315	7/1984	Uchenick .	5,048,085	9/1991	Abraham et al. .
4,462,076	7/1984	Smith .	5,050,213	9/1991	Shear .
4,462,078	7/1984	Ross .	5,091,966	2/1992	Bloomberg et al. .
4,465,901	8/1984	Best .	5,103,392	4/1992	Mori et al. .
4,471,163	9/1984	Donald et al. .	5,103,476	4/1992	Waite et al. .
4,484,217	11/1984	Block et al. .	5,111,390	5/1992	Ketcham .
4,494,156	1/1985	Kadison et al. .	5,119,493	6/1992	Janis et al. .
4,513,174	4/1985	Herman .	5,128,525	7/1992	Stearns et al. .
4,528,588	7/1985	Lofberg .	5,136,643	8/1992	Fischer .
4,528,643	7/1985	Freeny .	5,136,646	8/1992	Haber .
4,553,252	11/1985	Egendorf .	5,136,647	8/1992	Haber .
4,558,176	12/1985	Arnold et al. .	5,136,716	8/1992	Harvey et al. .
4,558,413	12/1985	Schmidt et al. .	5,146,575	9/1992	Nolan .
4,562,306	12/1985	Chou et al. .	5,148,481	9/1992	Abraham et al. .
4,562,495	12/1985	Bond et al. .	5,155,680	10/1992	Wiedemer .
4,577,289	3/1986	Comerford et al. .	5,163,091	11/1992	Graziano et al. .
4,584,641	4/1986	Guglielmino .	5,168,147	12/1992	Bloomberg .
4,588,991	5/1986	Atalla .	5,185,717	2/1993	Mori .
4,589,064	5/1986	Chiba et al. .	5,201,046	4/1993	Goldberg et al. .
4,593,353	6/1986	Pickholtz .	5,201,047	4/1993	Maki et al. .
4,593,376	6/1986	Volk .	5,208,748	5/1993	Flores et al. .
4,595,950	6/1986	Lofberg .	5,214,702	5/1993	Fischer .
4,597,058	6/1986	Izumi et al. .	5,216,603	6/1993	Flores et al. .
4,634,807	1/1987	Chorley et al. .	5,221,833	6/1993	Hecht .
4,644,493	2/1987	Chandra et al. .	5,222,134	6/1993	Waite et al. .
4,646,234	2/1987	Tolman et al. .	5,224,160	6/1993	Paulini et al. .
4,652,990	3/1987	Pailen et al. .	5,224,163	6/1993	Gasser et al. .
4,658,093	4/1987	Hellman .	5,235,642	8/1993	Wobber et al. .
4,670,857	6/1987	Rackman .	5,245,165	9/1993	Zhang .
4,672,572	6/1987	Alsberg .	5,247,575	9/1993	Sprague et al. .
4,677,434	6/1987	Fascenda .	5,260,999	11/1993	Wyman .
4,680,731	7/1987	Izumi et al. .	5,263,158	11/1993	Janis .
4,683,553	7/1987	Mollier .	5,265,164	11/1993	Matyas et al. .
4,685,056	8/1987	Barnsdale et al. .	5,276,735	1/1994	Boebert et al. .
			5,280,479	1/1994	Mary .

## Page 3

FOREIGN PATENT DOCUMENTS

WO 92/06438 4/1992 (WO).  
 WO 92/22870 12/1992 (WO).  
 WO 93/01550 1/1993 (WO).  
 WO 94/01821 1/1994 (WO).  
 WO 94/03859 2/1994 (WO).  
 WO 94/06103 3/1994 (WO).  
 WO 94/16395 7/1994 (WO).  
 WO 94/18620 8/1994 (WO).  
 WO 94/22266 9/1994 (WO).  
 WO 94/27406 11/1994 (WO).  
 WO 95/14289 5/1995 (WO).  
 WO 96/00963 1/1996 (WO).  
 WO 96/03835 2/1996 (WO).  
 WO 96/05698 2/1996 (WO).  
 WO 96/06503 2/1996 (WO).  
 WO 96/13013 5/1996 (WO).  
 WO 96/21192 7/1996 (WO).  
 WO 96/24092 8/1996 (WO).  
 WO 97/03423 1/1997 (WO).  
 WO 97/07656 3/1997 (WO).  
 WO 97/32251 9/1997 (WO).  
 WO 97/48203 12/1997 (WO).

## OTHER PUBLICATIONS

Claude Baggett, Cable's Emerging Role in the Information Superhighway, Cable Labs, (undated) 13 slides.

Theodore Sedgwick Barassi, Document from Internet: The Cybernotary: Public Key Registration and Certification and Authentication of International Legal Transactions, (undated), 4 pages.

Hugh Barnes, e-mail to Henry LaMuth, subject: George Gilder articles, May 31, 1994, 2 pages.

Comments in the Matter of Public Hearing and Request for Comments on the International Aspects of the National Information Infrastructure, Before the Department of Commerce, Aug. 12, 1994, pp. 1-15 (comments of Dan Bart).

Michael Baum, "Worldwide Electronic Commerce: Law, Policy and Controls Conference," program details, Nov. 11, 1993, 18 pages.

Robert M. Best, Preventing Software Piracy With Crypto-Microprocessors, Digest of Papers, VLSI: New Architectural Horizons, Feb. 1980, pp. 466-469.

Richard L. Bisbey, II and Gerald J. Popek, Encapsulation: An Approach to Operating System Security, (USC/Information Science Institute, Marina Del Rey, CA) Oct. 1973, pp. 666-675.

Rolf Blom, Robert Forchheimer, et al. Encryption Methods in Data Networks, Ericsson Technics, No. 2, Stockholm, Sweden, 1978.

Rick E. Bruner, Document from the Internet: PowerAgent, NetBot help advertisers reach Internet shoppers, Aug. 1997, 3 pages.

Denise Caruso, Technology, Digital Commerce: 2 plans for watermarks, which can bind proof of authorship to electronic works, N.Y. Times, Aug. 7, 1995, p. D5.

A.K. Choudhury, N. F. Maxemchuk, et al., Copyright Protection for Electronic Publishing Over Computer Networks, (AT&T Bell Laboratories, Murray Hill N. J.) Jun. 1994, 17 pages.

Tim Clark, Ad service gives cash back, <www.news.com/News/Item/0,4,13050,00.html> (visited Aug. 4, 1997) 2 pages.

Donna Cunningham, David Arneke, et al., Document from the Internet: AT&T, VLSI Technology join to improve info highway security, (News Release) Jan., 31, 1995, 3 pages.

Lorcan Dempsey and Stuart Weibel, The Warwick Metadata Workshop: A Framework for the Deployment of Resource Description, D-Lib Magazine, Jul., 15, 1996.

Dorothy E. Denning and Peter J. Denning, Data Security, 11 Computing Surveys No. 3, Sep. 1979, pp. 227-249.

Whitfield Diffie and Martin E. Hellman, New Directions in Cryptography, IEEE Transactions on Information Theory, vol. 22, No. 6, Nov. 1976, pp. 644-651.

Whitfield Diffie and Martin E. Hellman, Privacy and Authentication: An Introduction to Cryptography, Proceedings of the IEEE, vol. 67, No. 3, Mar. 1979 pp. 397-427.

Stephen R. Duse and Burton S. Kaliski, A Cryptographic Library for the Motorola 56000, Advances in Cryptology-Proceedings Eurocrypt 90, (I.M. Damgard, ed., Springer-Verlag) 1991, pp. 230-244.

Esther Dyson, Intellectual Value, Wired Magazine, Jul. 1995, pp. 136-141 and 182-183 (This article is not prior art.).

Science, space and technology, Hearing before Subcomm. on Technology, Environment, and Aviation, May 26, 1994 (testimony of D. Linda Garcia).

James Gleick, Dead as a Dollar, The New York Times Magazine, Jun. 16, 1996, Sect. 6, pp. 26-30, 35, 42, 50, 54.

Fred Greguras, Document from Internet: Softec Symposium '95, Copyright Clearances and Moral Rights, Dec. 11, 1995, 3 pages.

Louis C. Guillou, Smart Cards and Conditional Access, Advances in Cryptography-Proceedings of EuroCrypt 84 (T. Beth et al, Ed., Springer-Verlag) 1985, pp. 480-490.

Harry H. Harman, Modern Factor Analysis, Third Edition Revised, University of Chicago Press, Chicago and London, 1976.

Amir Herzberg and Shlomit S. Pinter, Public Protection of Software, ACM Transactions on Computer Systems, vol. 5, No. 4, Nov. 1987, pp. 371-393.

Jud Hofmann, Interfacing the NII to User Homes, (Consumer Electronic Bus Committee) NIST, Jul. 1994, 12 slides.

Jud Hofmann, Interfacing the NII to User Homes, Electronic Industries Association, (Consumer Electronic Bus Committee) (undated), 14 slides.

Stannie Holt, Document from the Internet: Start-up promises user confidentiality in Web marketing service, InfoWorld Electric News (updated Aug. 13, 1997).

Jay J. Jiang and David W. Conrath, A concept-based Approach to Retrieval from an Electronic Industrial Directory, International Journal of Electronic Commerce, vol. 1, No. 1 (fall 1996) pp. 51-72.

Debra Jones, Document from the Internet: Top Tech Stories, PowerAgent Introduces First Internet 'Informediary' to Empower and Protect Consumers, (updated Aug. 13, 1997) 3 pages.

Kevin Kelly, E-Money, Whole Earth Review, Summer 1993, pp. 40-59.

Stephen Thomas Kent, Protecting Externally Supplied Software in Small Computers, (MIT/LCS/TR-255) Sep. 1980 254 pages.

David M. Kristol, Steven H. Low and Nicholas F. Maxemchuk, Anonymous Internet Mercantile Protocol, (AT&T Bell Laboratories, Murray Hill, NJ) Draft: Mar. 17, 1994.

Carl Lagoze, The Warwick Framework, A Container Architecture for Diverse Sets of Metadata, D-Lib Magazine, Jul./Aug. 1996.